IN THE CLAIMS

1. (Previously Presented) A method of designing a line system, the method comprising a computer performing the steps of:

obtaining a set of one or more demands for use in computing the line system design, wherein the one or more demands comprise one or more bandwidth requests;

representing the line system design as a graph in accordance with a graph coloring operation wherein colors represent bandwidths such that bandwidths are assigned and the one or more demands are routed so as to attempt to achieve a minimum total design cost; and

specifying a line system design based on the assigned bandwidths and the routed demands.

2. (Original) The method of claim 1, wherein colors are partitioned in sets and the sets are ordered so that colors in higher sets cost more than colors in lower sets.

3. (Original) The method of claim 2, wherein a link of the graph represents a location of a component of the line system being designed.

4. (Previously presented) The method of claim 3, wherein a cost of a link in a coloring is equal to a cost of the most expensive set such that a demand going through the link is colored with a color in the most expensive set.

5. (Original) The method of claim 3, further wherein colors are assigned to the demands such that no two demands routed on the same link of the graph are assigned the same color.

6. (Original) The method of claim 1, wherein the line system being designed is a linear line system.

7. (Previously presented) The method of claim 6, further comprising the step of representing the line system design by an interval graph.

8. (Previously presented) A method of designing a line system, the method comprising a computer performing the steps of:

obtaining a set of one or more demands for use in computing the line system design;

representing the line system design as a graph in accordance with a graph coloring operation, wherein colors represent bandwidths such that bandwidths are assigned and the one or more demands are routed so as to attempt to achieve a minimum total design cost;

computing the graph coloring operation to an $O(\sqrt{s})$ -approximation, where $s$ is a value proportional to a number of color sets; and

specifying a line system design based on the assigned bandwidths and the routed demands.

9. (Previously presented) The method of claim 1, further comprising the step of polynomially computing the graph coloring operation.

10. (Canceled).

11. (Previously presented) A method of designing a line system, the method comprising a computer performing the steps of:

obtaining a set of one or more demands for use in computing the line system design, wherein the line system being designed is a circular line system;

representing the line system design as a graph in accordance with a graph coloring operation, wherein colors represent bandwidths such that bandwidths are assigned and the one or more demands are routed so as to attempt to achieve a minimum total design cost;

computing the graph coloring operation to a $2(1 + \epsilon)$-approximation; and

specifying a line system design based on the assigned bandwidths and the routed demands.

12. (Currently amended) The method of claim [[10]] 11, wherein a link of the graph represents a location of a component of the circular line system being designed.

13. (Original) The method of claim 12, wherein a demand is routed either clockwise or counterclockwise and colors are assigned to demands such that no two demands routed on the same link are assigned the same color.

14. (Original) The method of claim 1, wherein the line system being designed is an optical line system.

15. (Previously presented) Apparatus for designing a line system, the apparatus comprising:

a memory; and

at least one processor coupled to the memory and configured to: (i) obtain a set of one or more demands for use in computing the line system design, wherein the one or more demands comprise one or more bandwidth requests; (ii) represent the line system design as a graph in accordance with a graph coloring operation wherein colors represent bandwidths such that bandwidths are assigned and the one or more demands are routed so as to attempt to achieve a minimum total design cost; and (iii) specify a line system design based on the assigned bandwidths and the routed demands.

16. (Original) The apparatus of claim 15, wherein colors are partitioned in sets and the sets are ordered so that colors in higher sets cost more than colors in lower sets.

17. (Original) The apparatus of claim 16, wherein a link of the graph represents a location of a component of the line system being designed.

18. (Previously presented) The apparatus of claim 17, wherein a cost of a link in a coloring is equal to a cost of the most expensive set such that a demand going through the link is colored with a color in the most expensive set.

19. (Original) The apparatus of claim 17, further wherein colors are assigned to the demands such that no two demands routed on the same link of the graph are assigned the same color.

20. (Original) The apparatus of claim 15, wherein the line system being designed is a linear line system.

21. (Previously presented) The apparatus of claim 20, wherein the processor is further configured to represent the line system design by an interval graph.

22. (Previously presented) Apparatus for designing a line system, the apparatus comprising:

a memory; and

at least one processor coupled to the memory and configured to: (i) obtain a set of one or more demands for use in computing the line system design; (ii) represent the line system design as a graph in accordance with a graph coloring operation wherein colors represent bandwidths such that bandwidths are assigned and the one or more demands are routed so as to attempt to achieve a minimum total design cost; (iii) compute the graph coloring operation to an $O(\sqrt{s})$ -approximation, where $s$ is a value proportional to a number of color sets; and (iv) specify a line system design based on the assigned bandwidths and the routed demands.

23. (Previously presented) The apparatus of claim 15, wherein the processor is further configured to polynomially compute the graph coloring operation.

24. (Original) The apparatus of claim 15, wherein the line system being designed is a circular line system.

25. (Previously presented) Apparatus for designing a line system, the apparatus comprising:

a memory; and

at least one processor coupled to the memory and configured to: (i) obtain a set of one or more demands for use in computing the line system design, wherein the line system being designed is a circular line system; (ii) represent the line system design as a graph in accordance with a graph coloring operation wherein colors represent bandwidths such that bandwidths are assigned and the one or more demands are routed so as to attempt to achieve a minimum total design cost; (iii) compute the graph coloring operation to a $2(1 + \epsilon)$-approximation; and (iv) specify a line system design based on the assigned bandwidths and the routed demands.

26. (Original) The apparatus of claim 24, wherein a link of the graph represents a location of a component of the circular line system being designed.

27. (Original) The apparatus of claim 26, wherein a demand is routed either clockwise or counterclockwise and colors are assigned to demands such that no two demands routed on the same link are assigned the same color.

28. (Original) The apparatus of claim 15, wherein the line system being designed is an optical line system.

29. (Previously presented) An article of manufacture for designing a line system, comprising a machine readable storage medium containing one or more programs which when executed implement the steps of:

obtaining a set of one or more demands for use in computing the line system design, wherein the one or more demands comprise one or more bandwidth requests;

representing the line system design as a graph in accordance with a graph coloring operation wherein colors represent bandwidths such that bandwidths are assigned and the one or more demands are routed so as to attempt to achieve a minimum total design cost; and

specifying a line system design based on the assigned bandwidths and the routed demands.